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## The level of knowledge of high school students from lubelskie voivodeship about performing first aid

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### Abstract

#### Introduction

First aid plays a key role in saving human life. It not only prevents the deterioration of the victim's health, but also determines survival. Every year, thousands of people die of various injuries, car accidents and other critical situations. This figure could be significantly lower if the accident witnesses provided first aid to the victims.

## **Material and method**

Diagnostic survey was selected as the research method, and the research tool was an authorial questionnaire, examining the level of students' knowledge about first aid. It was based on the guidelines of the European Resuscitation Council 2015. The questionnaire consisted of 20 closed single-choice questions and only one of the 4 answers was correct. The obtained results were statistically analyzed using STATISTICA 12 software (StatSoft Polska). For the correlation study the  $\chi^2$  test was used, and the significance level was taken as  $p < 0.05$ .

## **Aim**

The aim of the study was to verify and compare the level of knowledge concerning first aid among high school and technical secondary school students.

## **Results**

Nearly 63% of people had first aid training and 59.6% of women and 39.7% of men had already been giving first aid. About 40% of the respondents believed that their level of knowledge was at a very good level, where in reality it was much lower.

## **Conclusions**

Unfortunately, the general knowledge of first aid rules is unsatisfactory. The reason for this is a false belief that the acquired knowledge does not require repetition and updating.

**Keywords: first aid; emergency medicine; resuscitation**

## **Background**

The awareness of being safe is one of the main principles of the existence and development of every human being. Its lack may cause a threat to life or health [2]. Call for help as soon as possible is the most important procedure for the injured person. The reason why the cardiovascular arrest has occurred is not important at the moment [1]. Various events and injuries caused by human thoughtlessness are the result of the death of as many as 3.5 million people a year. Damage to the body is the third cause of death at the world, after cardiovascular diseases and cancer [3]. Cardiac arrest is the main cause of death in Europe. In Poland, it is about 1/1000 people per year in out-of-hospital conditions. Death occurs every 90 seconds, and one of the reasons is the lack of first aid [4, 5].

There are many situations that can put life and health at risk. Unexpected cases make first aid awareness necessary. Under this name we have to identify actions that are carried out in the place of the event. They are usually carried out by a person who has become a witness by accident. One's health and life may very often depend on how first aid is given [6].

Every citizen should know how to give first aid and be able to give it before the appropriate emergency services arrive [7, 8]. Accident witnesses take action in less than 20% of cases when this help may determine someone's future health. Every minute of delay in resuscitation reduces the chances of success by 10-12%. The changes in the brain due to

hypoxia occur after only 4 minutes and are irreversible. After 20-30 minutes, the medulla oblongata dies which contains center responsible for breathing, sucking, chewing, swallowing, locomotive center, vasomotor center and cardiac center. Numerous studies prove that rapid reaction and immediate rescue action taken by witnesses of the event, increases the chance of survival several times [9]. Education, awareness raising and readiness for first aid by a potential witness are necessary [10].

## **Material and method**

The survey was conducted among 250 young people, students of secondary school (both secondary school and technical secondary school) residing in Lubelskie voivodeship. The age of respondents ranged between 16 and 19 years of age. The research was conducted using the diagnostic survey method, using for this purpose a research tool in the form of an anonymous questionnaire consisting of 20 authorial, closed questions, which were single choice. They were based on the European Resuscitation Council's 2015 Guidelines to examine the state of knowledge on first aid. Responses to questions concerning cardiopulmonary resuscitation, choking, using AED and first aid principles were evaluated. Respondents were selected on purpose. The selection criteria were:

- responders should be students of the first, second, third or fourth year of high school,
- secondary schools should be located in the Lubelskie voivodeship.

After meeting the criteria, two schools located in the city of Lublin were randomly selected for the study. The results obtained were statistically analyzed using the STATISTICA 12 software (StatSoft Polska). For the correlation study the  $\chi^2$  test was used, and the significance level was taken as  $p < 0.05$ .

## **Results**

99 women (39.6% of the respondents) and 151 men (60.4% of the respondents) took part in the survey. 137 of them were secondary school students (54.8% of the respondents) and 113 were technician secondary school students (45.2% of the respondents). The most numerous group of respondents were those living in urban areas- 190 people (76% of respondents). There were 60 people living in the countryside (24% of respondents). The participants were students of high school classes I-IV. There were 51 students in class I (20.4% of the responders), students in class II - 63 (25.2% of the respondents), students in class III - 85 (34% of the respondents) and students in class IV - 51 (20.4% of the respondents).

The respondents were asked if they had ever given first aid. There were 59 women who provided first aid (59.6%) and 60 male (39.7%). The number of women who had never given first aid was 40 (40.4%), while the number of men was 91 (60.3%). Among high school students, 77 people gave first aid (56.2%), 60 people never gave it (43.8%) and among students of technical secondary school there were 42 people (37.2%) and 71 people (62.8%). The number of people providing first aid at any time and inhabiting urban areas was 101 people (53.2%), while people living in the countryside 18 (30%). People who live in urban areas but did not provide first aid were 89 (46.8%) and people living in the countryside 42 (70%).

The most common answer among men was that they had never given first aid. Among high school students, most people said they were giving first aid and among students of the technical college that they did not. Students living in urban areas provided first aid more often than students living in the countryside.

Statistical analysis showed significant statistical differences. The analysis showed that women (59.6%), secondary school students (56.2%) and respondents living in the urban area (53.2%) were more likely to provide first aid in comparison with other respondents (Table 1).

Table 1. Reply of respondents to the question: Have you ever given first aid?

Have you ever given first aid?		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
Yes	N	59	60	77	42	101	18
	%	59.6	39.7	56.2	37.2	53.2	30.0
No	N	40	91	60	71	89	42
	%	40.4	60.3	43.8	62.8	46.8	70.0
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 9.456$ df = 1 p = 0.003		$\chi^2 = 8.997$ df = 1 p = 0.003		$\chi^2 = 9.804$ df = 1 p = 0.002	

Then the participants were asked how they evaluate their level of knowledge about the first aid rules. The most common answer among women was that they rated it very well - 57 people (57.6%), while men that their knowledge is good - 65 people (43%). The secondary school students most often responded that their knowledge was very good - 70 (51.1%) and the students of technical secondary school - 48 (42.5%). People living in urban areas declared most often that the level was good - 79 people (41.6%) and people living in rural areas that the level was good - 19 (31.7%) and bad - 19 (31.7%).

Statistical analysis showed significant statistical differences. The analysis showed that women (57.6%), secondary school students (51.1%) and respondents living in the urban area (41.6%) were more likely to declare their level of knowledge as very good in comparison to others (Table 2).

Table 2. Answer of respondents to the question: How would you rate your level of knowledge about first aid?

How would you rate your level of knowledge about first aid?		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
Very good	N	57	37	70	24	79	15
	%	57.6	24.5	51.1	21.2	41.6	25.0
Well	N	25	65	42	48	71	19
	%	25.3	43.0	30.7	42.5	37.4	31.7
Moderate	N	4	12	5	11	9	7
	%	4.0	7.9	3.6	9.7	4.7	11.7
Bad	N	13	37	20	thirty	31	19
	%	13.1	24.5	14.6	26.5	16.3	31.7
Very bad	N	0	0	0	0	0	0
	%	0.0	0.0	0.0	0.0	0.0	0.0
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 27.946$ df = 3 p = 0.000		$\chi^2 = 25.088$ df = 3 p = 0.000		$\chi^2 = 12.540$ df = 3 p = 0.006	

Next, the respondents' answers concerning their actual knowledge of the first aid rules were taken into account. Unfortunately, they were different from their subjective assessment. The level of knowledge of 28 women (28.3%), 42 men (27.8%), 46 secondary school pupils (33.6%), 24 students of technical secondary schools (21.2%) as well as 53 people living in urban areas (27.9%) and 17 people living in rural areas (28.3%) oscillates in the range of very good/good. Medium level was achieved by 61 women (61.6%), 92 men (60.9%), 77 people attending secondary school (56.2%), 76 people attending technical secondary school (67.3%), 116 people living in urban areas (61.1%) and 37 people living in rural areas (61.7%). In the last group at the level of bad/very bad knowledge there were 10 women (10.1%), 17 men (11.3%), 14 people living in urban areas (11.1%) and 13 people living in rural areas (10%).

Statistical analysis did not reveal any significant statistical differences (Table 3).

Table 3. The level of knowledge of first aid in the study group

The level of knowledge about first aid in the study group		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
Very good / good	N	28	42	46	24	53	17
	%	28.3	27.8	33.6	21.2	27.9	28.3
Moderate	N	61	92	77	76	116	37
	%	61.6	60.9	56.2	67.3	61.1	61.7
Bad, very bad	N	10	17	14	13	21	6
	%	10.1	11.3	10.2	11.5	11.1	10.0
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 0,083$ df = 2 p = 0.959		$\chi^2 = 4.697$ df = 2 p = 0.096		$\chi^2 = 0,053$ df = 2 p = 0.974	

The next question concerned if the respondents knew and realized who should provide first aid on the site of event. It is certainly positive that women - 71 people (71.7%) and men - 103 people (68.2%) answered correctly that every witness of the event should provide first aid. The same answer was given by the students of the secondary school - 95 (69.3%) and technical secondary school - 79 (69.9%) as well as students living in urban areas - 139

(73.2%) and rural - 35 (58.3%). Only a small number of respondents answered this question incorrectly.

Statistical analysis showed significant statistical differences. The analysis showed that respondents living in the city (73.2%), more often than those living in rural areas (58.3%) responded that first aid should be given by each witness of the event (Table 4).

Table 4. Reply of the respondents to the question: Who according to the law should provide first aid?

Who, according to the law should provide first aid?		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
Only health care professionals	N	6	5	5	6	10	1
	%	6.1	3.3	3.6	5.3	5.3	1.7
Each witness events	N	71	103	95	79	139	35
	%	71.7	68.2	69.3	69.9	73.2	58.3
Only people who completed the first aid course	N	22	42	36	28	41	23
	%	22.2	27.8	26.3	24.8	21.6	38.3
Only after completing the qualified first aid course	N	0	1	1	0	0	1
	%	0.0	0.7	0.7	0.0	0.0	1.7
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 2,519$ df = 3 p = 0.472		$\chi^2 = 1,270$ df = 3 p = 0.736		$\chi^2 = 10.947$ df = 3 p = 0.012	

Then, it was asked how deep the chest should be compressed during CPR. The most common answer to this question among women was 4-5 cm. This is the response of 65 women (65.7%). Unfortunately, this response is an incorrect one. However, among women there was also a correct 5-6 cm answer. This was the response of 31 women (31.3%). The

correct answer was given by 85 men (56.3%). Also, among high school students, the majority of them gave the same incorrect answer as in women, i. e. 74 respondents (54%). 60 students (53.1%) among technical secondary school students responded in the same way as in men. The same situation is also true for the answers of people inhabiting urban areas - the answer was bad for 99 people (52.1%) and good for people living in rural areas - for 32 people (53.3%).

Statistical analysis showed significant statistical differences. The analysis showed that men (56.3%) and respondents living in rural areas (53.3%) were more likely to give the correct answer (during cardiopulmonary and respiratory resuscitation we press the chest to a depth of 5-6cm) in comparison to the others (Table 5).

Table 5. Reply of the respondents to the question: At what depth we press the chest during CPR?

At what depth we press the chest during CPR?		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
4 - 5 cm	N	65	56	74	47	99	22
	%	65.7	37.1	54.0	41.6	52.1	36.7
5 - 6 cm	N	31	85	56	60	84	32
	%	31.3	56.3	40.9	53.1	44.2	53.3
3 - 4 cm	N	1	9	6	4	7	3
	%	1.0	6.0	4.4	3.5	3.7	5.0
There is no difference	N	2	1	1	2	0	3
	%	2.0	0.7	0.7	1.8	0.0	5.0
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 22.707$ df = 3 p = 0.000		$\chi^2 = 4.635$ df = 3 p = 0.201		$\chi^2 = 12.761$ df = 3 p = 0.005	



The most common answer to the question about the frequency with which the chest should be compressed during the CPR among woman - 69 (69.7%) and also among men - 95 respondents (62.9%) was response that with frequency 100-120/min. The same response was among high school students - 100 people (73%) and among technical secondary school students - 64 (56.6%). Also, residents of the urban area - 127 (66.8%) and rural areas - 37 people (61.7%) responded correctly. It is certainly positive that most people in the two groups have responded correctly to this question.

Statistical analysis showed significant statistical differences (Table 6).

Table 6. Reply of the respondents to the question: What is the correct chest compression rate during cardiopulmonary and respiratory resuscitation?

What is the correct chest compression rate during cardiopulmonary and respiratory resuscitation?		Sex		School		Place of residence	
		Woman	Man	Secondary school	Technical Secondary school	City	Village
100 - 120 / min	N	69	95	100	64	127	37
	%	69.7	62.9	73.0	56.6	66.8	61.7
80 - 100 / min	N	5	5	4	6	9	1
	%	5.1	3.3	2.9	5.3	4.7	1.7
60 - 80 / min	N	19	37	25	31	44	12
	%	19.2	24.5	18.2	27.4	23.2	20.0
No difference	N	6	14	8	12	10	10
	%	6.1	9.3	5.8	10.6	5.3	16.7
Together	N	99	151	137	113	190	60
	%	100.0	100.0	100.0	100.0	100.0	100.0
Statistical analysis		$\chi^2 = 2,395$ df = 3 p = 0.495		$\chi^2 = 7.511$ df = 3 p = 0.057		$\chi^2 = 8,876$ df = 3 p = 0.031	

According to the analysis, urban residents were more likely to respond correctly (the correct chest compression rate during cardiopulmonary and respiratory resuscitation is 100-120/min) in comparison to the others.

## Discussion

Education in the field of first aid in schools is aimed at increasing safety not only within but also outside school. Teaching first aid should be based on current guidelines. The problem in Polish schools is the lack of a unified and well-organized first aid system at all stages of education. This problem is noticed by the non-governmental organizations, which often carry out actions where they want to introduce this topic. In our questionnaire 67.7% of women and 59.6% men had first aid training courses. First aid training was received by more high school students than by technician secondary school students (67.9% vs 56.6%) and more by people in the city than in the countryside (65.0% vs. 62.1%). The number of people who participated in the first aid training is far too small. The Minister of National Education specifies in his ordinance that the headmaster of the school must organize first aid training [13]. First aid training should be completed by every student and these skills should be regularly trained and recalled.

The importance of first aid education is demonstrated by the positive answer given by nearly half of the respondents to the question: "Have you ever given first aid?". This indicates that the pupils were confronted with situations where they could use first aid knowledge. Women (57.6%), secondary school students (51.1%) and city residents (41.6%) rated their first aid level as very good. However, many pupils had problems with correct answers to basic questions about first aid. The majority of respondents did not answer correctly the question concerning wound supply (only about 52% of respondents answered correctly) and the depth at which the chest should be compressed during resuscitation- only 46.4% of respondents replied correctly. Respondents answered the following questions best: "What should you do first on event site?" (about 90% correct) and about 85% of people knew what AED is and how it should be used. Women answered the questions correctly more often, but the difference with men was not significant. The inhabitants of the countryside and cities gave similarly correct answers. None of the respondents replied that their level of knowledge about first aid was very bad, which indicates that they had already come into contact with this issue. On the other hand, nearly 83% of respondents have never heard of the European/Polish Resuscitation Council, whose guidelines are the basis for first aid training. According to the answers, the examined persons do not realize how low their level of knowledge about first aid is. Weaknesses in first aid education may result from under-training of children and young people throughout the education process. Another reason may be insufficient teachers' knowledge of first aid delivery [14]. According to the Act of 8 September 2006 about the

State Medical Rescue Service, educational classes in the field of first aid may be conducted by: system doctors and nurses, paramedics and teachers who have undergone appropriate training [11]. Article § 10, defining the qualifications for conducting educational classes in the field of first aid in schools, says that they are held by a person who has a certificate confirming the preparation for conducting educational classes in the field of first aid, obtained in accordance with regulations [12]. The role of the school principal is to organize training courses in which teachers could gain the necessary knowledge about first aid, but in practice, according to one study, most teachers encountered this issue when acquiring skills in other fields (health and safety course, driving license course) [15]. The problem may also be a lack of interest and a sense of the need to learn about first aid among students. The school should not only teach first aid but also raise public awareness of the need for this education [15]. First aid courses for students should be regularly conducted by qualified health professionals, as they have not only knowledge but also practical skills. By spreading knowledge about first aid, it would be possible to improve the health of many people and reduce the number of deaths in situations where giving the first aid correctly would avoid this.

### **Conclusions:**

The research shows that:

1. Women are more likely to provide first aid than men. The same is true for high school pupils compared to students attending a technical secondary school. This may be due to the fact that high school students have more classes on this subject and are not afraid to provide first aid.
2. Young people living in the city are more often witnesses of various events, where victims need help, which is why statistically they provide help more often.
3. Women believe that they have a higher level of first aid knowledge than men.
4. Respondents generally define their level of knowledge as good/very good, but this level is lower. This is due to the fact that classes at school are not conducted by qualified medical staff but by teachers following regular courses. The level of knowledge may also be too low due to the low number of first aid classes. A large group of respondents does not know the current guidelines of the European Resuscitation Council.
5. Most of the respondents believe that providing first aid to victims is not only a duty, but also an opportunity to save someone's life or health.

6. First aid education should start in kindergarten and last for all years of education and work.

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